Ethernet Communications Module Installation and Operation Instructions

S225-40-8

Figure 1.
Ethernet communications module.

Contents

Safety Information 2
- Hazard Statement Definitions 2
- Safety Instructions 2

Product Information 3
- Introduction 3
- Acceptance and Initial Inspection 3
- Handling and Storage 3
- Quality Standards 3

Installation Procedure 4
- Installing Ethernet Card in Cooper Control Cabinets 4
- Installing Ethernet Card in Non-Cooper Control Cabinets 6

Configuration/Operation 7
- Configuring **ProView** *NXG* Software to Communicate with the CL-6 Control via Ethernet Card 9

Appendix A 12
- Setting the IP Address of an Ethernet Card When it is Unknown 12

SAFETY FOR LIFE

Cooper Power Systems products meet or exceed all applicable industry standards relating to product safety. We actively promote safe practices in the use and maintenance of our products through our service literature, instructional training programs, and the continuous efforts of all Cooper Power Systems employees involved in product design, manufacture, marketing and service.

We strongly urge that you always follow all locally approved safety procedures and safety instructions when working around high-voltage lines and equipment and support our “Safety For Life” mission.

SAFETY INFORMATION

The instructions in this manual are not intended as a substitute for proper training or adequate experience in the safe operation of the equipment described. Only competent technicians, who are familiar with this equipment should install, operate and service it.

A competent technician has these qualifications:

- *Is thoroughly familiar with these instructions.*
- *Is trained in industry-accepted high- and low-voltage safe operating practices and procedures.*
- *Is trained and authorized to energize, de-energize, clear, and ground power distribution equipment.*
- *Is trained in the care and use of protective equipment such as flash clothing, safety glasses, face shield, hard hat, rubber gloves, clampstick, hotstick, etc.*

Following is important safety information. For safe installation and operation of this equipment, be sure to read and understand all cautions and warnings.

Hazard Statement Definitions

This manual may contain four types of hazard statements:

⚠ DANGER:

Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING:

Indicates a hazardous situation which, if not avoided, could result In death or serious injury.

⚠ CAUTION:

Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

CAUTION: Indicates a hazardous situation which, if not avoided, could result in equipment damage only.

Safety Instructions

Following are general caution and warning statements that apply to this equipment. Additional statements, related to specific tasks and procedures, are located throughout the manual.

⚠ DANGER:

Hazardous voltage. Contact with hazardous voltage will cause death or severe personal injury. Follow all locally approved safety procedures when working around high- and low-voltage lines and equipment. G103.3

⚠ WARNING:

Before installing, operating, maintaining, or testing this equipment, carefully read and understand the contents of this manual. Improper operation, handling or maintenance can result in death, severe personal injury, and equipment damage. G101.0

⚠ WARNING:

This equipment is not intended to protect human life. Follow all locally approved procedures and safety practices when installing or operating this equipment. Failure to comply can result in death, severe personal injury and equipment damage. G102.1

⚠ WARNING:

Power distribution and transmission equipment must be properly selected for the intended application. It must be installed and serviced by competent personnel who have been trained and understand proper safety procedures. These instructions are written for such personnel and are not a substitute for adequate training and experience in safety procedures. Failure to properly select, install or maintain power distribution and transmission equipment can result in death, severe personal injury, and equipment damage. G122.3

PRODUCT INFORMATION

Introduction

Service Information S225-40-8 provides the installation and operation instructions for a CL-6 series regulator control Ethernet communications module.

Read This Manual First

Read and understand the contents of this manual and follow all locally approved procedures and safety practices before installing or operating this equipment. Read and understand the manuals detailing the installation and operation of the regulator and the regulator control used with the regulator. Refer to *S225-11-1 CL-6 Series Control Installation, Operation, and Maintenance Instructions* for information on the CL-6 series voltage regulator control. Refer to *S225-10-30 VR-32 Voltage Regulator with Quik-Drive™ Tap-Changer Installation, Operation, and Maintenance Instructions* for information on the Cooper Power Systems voltage regulator with Quik-Drive tap-changer.

Additional Information

These instructions cannot cover all details or variations in the equipment, procedures, or process described nor provide directions for meeting every possible contingency during installation, operation, or maintenance. For additional information, please contact your Cooper Power Systems representative.

Acceptance and Initial Inspection

This kit is thoroughly inspected at the factory. It is in good condition when accepted by the carrier for shipment.

Upon receipt of the regulator kit, a thorough inspection should be made for damage, evidence of rough handling, or shortages. Should this initial inspection reveal evidence of rough handling, damage, or shortages, it should be noted on the bill of lading and a claim should immediately be made with the carrier. Also, notify your Cooper Power Systems representative.

Handling and Storage

Be careful during handing and storage of equipment to minimize the possibility of damage. If the regulator kit is not to be placed into immediate use, store the kit where the possibility of damage is minimized.

Quality Standards

ISO 9001 Certified Quality Management System

Description

The Communications module accessory kit provides an interface for digital communication using DNP 3.0 protocol. For more information on DNP 3.0 protocol refer to *Reference Information R225-90-10 Data Dictionary Assignments for Communications Protocol DNP3 for use with CL-6 Series Regulator Controls* and *Reference Information R225-90-11 Device Profile Document for Communications Protocol DNP3 for use with CL-6 Series Regulator Control*.

INSTALLATION PROCEDURE

TABLE 1
Kit Parts Identification, Kit 57A64328400A
Ethernet Communication Module for CL-6 Controls

Item	Description	Qty
1	Interface Cable	1
2	Nylon cable clip	1
3	Machine screw, 6-32 x 1/2, round head	2
4	Flat washer, #8, stainless steel	2
5	Cable tie	8
6	Lock washer, #6, stainless steel	2
7	Ethernet/FO Communication Board	1
8	Stand-off stud, 1 1/4"	4
9	Stand-off stud 1/2"	6
10	Machine screw, 10-32 x 3/8", stainless steel	4
11	Lead assembly, #20, white/black	1
12	Lock washer, #10, stainless steel	4
13	Flat washer, #10, brass	4
14	Lead assembly, #20, white	1
15	Reference Drawings	2

Tools and Additional Accessories Required

Standard Screw Driver

Installing Ethernet Card in Cooper Control Cabinets

Follow these instructions to install the Ethernet Communications module accessory kits into a CL-6 series control from Cooper Power Systems. The preferred mounting location is the control box back panel or on the back of the CL-6B control. For instructions on installing the module on the back of the control, see the section in this manual "Installing Ethernet Card in Non-Cooper Control Cabinets".

1. De-energize the control panel according to the regulator manufacturers instructions.

   On Cooper Power Systems control boxes, open the **V_1** and **V_6** (if present) knife switches and close the **C** switch on the back panel. This will de-energize the control panel and also the back panel below the switches.

2. Locate the four mounting holes on the control back panel. See Figure 2.

   Note: These mounting holes are threaded to accept the stand-off studs.

3. Screw the 1 ¼" threaded stand-off studs into the mounting holes on the control box back panel. See Figure 2.

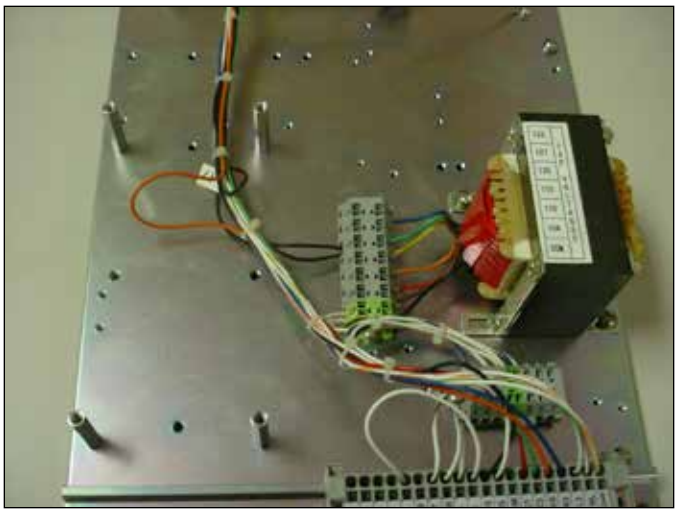


Figure 2.
Module mounting location with stand-off studs mounted, control box back panel.

4. Using the 10-32 x 3/8" screws, brass washers, and #10 lock washers, mount the communications module to the stand-off studs. The brass washer is placed directly on the communications module; the lock washer is placed between the brass washer and the screw.

   Note: The ST (fiber-optic) connectors should point down.

Figure 3.
Connecting power to module.

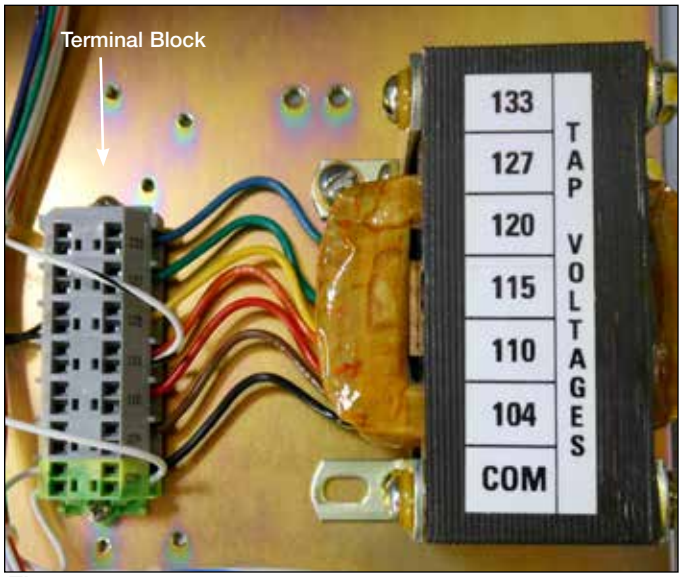


Figure 4.
RCT Terminal Block, use to obtain 115 Vac power source.

5. Connect 115 Vac power to the three-position terminal block on the right-hand side of the communication module. Using the White lead supplied, connect the "N" position to the COM position on the terminal block next to the RCT. Using the White/Black lead, connect the "L" position to the 115 position on the terminal block next to the RCT. See Figures 3 and 4.

6. Connect the provided interface cable to the jack on the right side of the communications module. See Figure 5.

7. Loosen the module mounting screw next to the RJ-45 port (lower right corner). Place the fork terminal of the grounding lead from the interface cable between the brass washer and the communication board and retighten the screw. See Figure 5.

Figure 5.
Connecting interface cable to module.

8. Install the second end of the interface cable to the CL-6 control panel. Mount the control cable fork terminal lead (grounding lead) to the second threaded hole adjacent the accessory jacks. See Figure 6. Use the 6-32 x 1/2" screw, #8 Flat washer, and #6 Lock washer to accomplish this.

Figure 6.
Connecting interface cable to CL-6 control panel.

9. Push the interface cable terminal connector into an open accessory jack on the side of the control panel (on CL-6 controls, the hinge side). Use the lower jack, Com 2, unless it is already in use. See Figure 6.
10. Use the supplied Nylon cable clip, route the control cable through the clip and mount the clip to the control using the threaded hole adjacent the accessory jacks. See Figure 6.
11. Route the cable along the back of the control panel and add cable ties where appropriate.
12. Set the DIP switch setting.

Ethernet Communication Module

A. Fiber communication set the DIP to Fiber position
B. Copper communication set the DIP to the Copper position

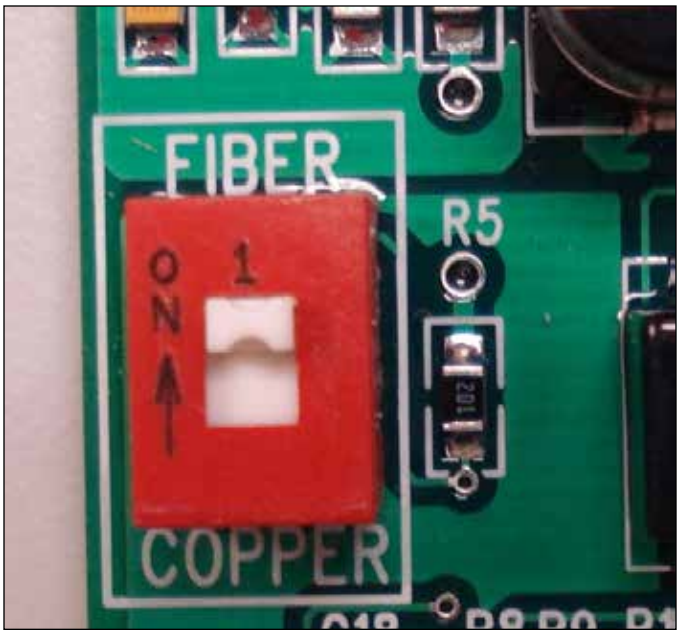


Figure 7.
Ethernet Communication Module.

Installing Ethernet Card in Non-Cooper Control Cabinets

Follow the steps below when mounting the communication module to a CL-6B series control which is in an enclosure from a manufacturer other than Cooper Power Systems.

1. De-energize the control panel according to the regulator manufacturers' instructions.
2. The communications board may be mounted at two possible locations on the rear of the CL-6B control panel. Each location is defined by four threaded mounting holes. Locate one set of four mounting holes on the rear of the CL-6B control panel. See Figure 8. Choose the set of mounting holes that best fits the space available in the cabinet.
3. Screw the 1/2" threaded stand-off studs into the rear of the CL-6B control panel. See Figure 8.
4. Go to Step 4 (on page 2) to continue the installation process.

Figure 8.
Stand-off studs on control panel.

CONFIGURATION / OPERATION

The Ethernet module must be configured before it can be accessed on the network. The CL-6 must also be configured to support the specific protocol and baud rate desired. Follow the steps below to configure the Ethernet Module and the CL-6 control.

Windows Security
The server 192.168.0.50 at (null) requires a username and password.
Warning: This server is requesting that your username and password be sent in an insecure manner (basic authentication without a secure connection).
User name
Password
Remember my credentials
OK
Cancel

1. Install the Ethernet module as shown the instructions above.
2. Connect the Card to your laptop/PC using a network cable. Set the dip switch on the card to copper. If connecting directly between the Ethernet card and a laptop/PC, a network cross-over cable may be required. However, laptops/PCs manufactured within the last several years should not require a cross over cable. A standard network cable may be used in these applications.
3. Power up the control and communication module.
4. Set your laptop/PC network settings to access the default address of the Ethernet card. Some systems will need the TCP/IP settings updated to reach the default IP address of the Ethernet card.

   Suggested TCP/IP settings are:

   IP address: 192.168.0.51
   Subnet Mask: 255.255.255.0
   Default Gateway: 0.0.0.0

   Please note that these settings should be returned to the original settings after the installation.
5. Open your web browser and type in the Ethernet module's default IP address (192.168.0.50) in the URL field. A window should appear requesting a user name and password. By default, there is no user name or password required.

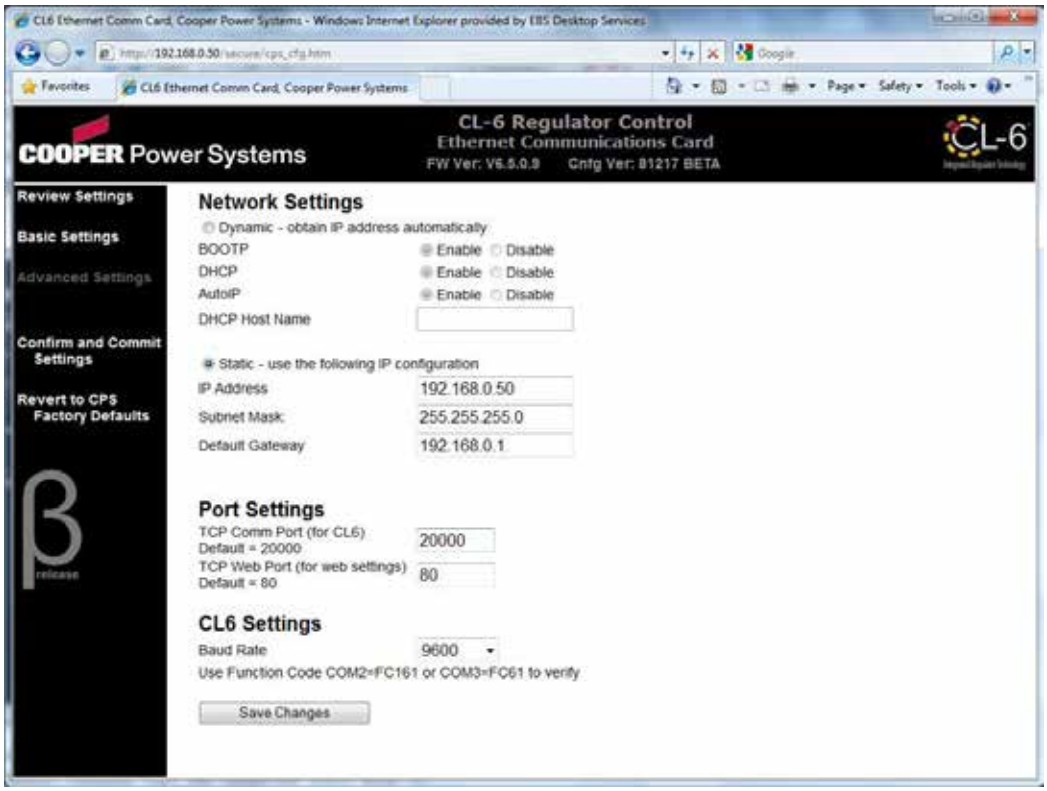
If the login window doesn't appear, the laptop/PC and Ethernet card are not connecting. Check the following:

A. Make sure the link LED on the Ethernet card is illuminated. If not, check the following:

- Ethernet card is powered up
- Network cable is connected to both the Ethernet card and the PC/Laptop.
- A cross over cable may be required.

B. Make sure the IP Address of the laptop/PC are updated as shown in step 4. To check this, go to START button, select RUN, and type in command. At the command prompt, type in IPCONFIG and hit the enter button. The IP address displayed must match the IP Address in Step 4.

6. Simply hit OK, and the Welcome Screen will appear. Click on Basic Settings (located on the left hand of the screen) to get to the screen shown below.



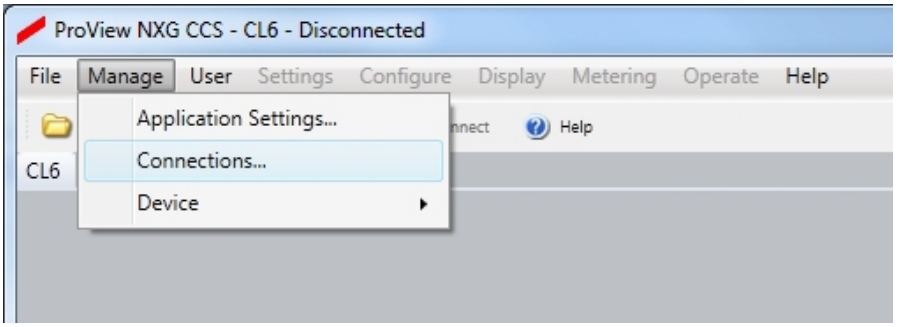
7. We recommend using a static IP address. The information needed can be obtained from your IT department.
8. Configure the remaining settings as needed. Using the default is recommended.
9. Once the IP address is set, press "Save Changes" and click “Commit Settings”.
10. Make sure the CL-6 is powered on
11. With the Ethernet module connected to Com 2 on the CL-6 control, set Function Code 160 (on the CL-6 control) to DNP.
12. With the Ethernet module connected to Com 2 on the CL-6 control, set Function Code 161 (on the CL-6 control) to 9600 baud rate. This should match the speed configured in the Ethernet card in Step 6 above.

For more information on the CL-6 DNP configuration, see the CL-6 *Service Information S225-11-1 CL-6 Series Control Installation, Operation, and Maintenance Instructions.*

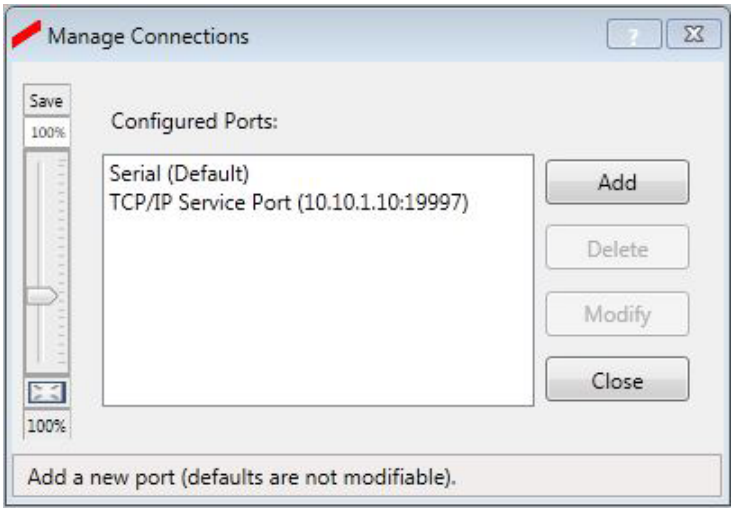
Configuring ProView *NXG*™ Software to Communicate with the CL-6 Control via Ethernet Card

1. Connect your computer to the Ethernet card, or the network on which the CL-6 control resides. Then start **ProView**™ *NXG* software.
2. Select the CL-6 control as the desired control and select the desired language and then click *Launch*.

3. In order to establish communications with a control for the first time, a communications port must be configured. Select Manage > Connections to open the *Manage Connections* dialog box.



4. In the *Manage Connections* dialog box, select *Add*.



5. Select TCP/IP (Network) from the connection type dropdown.

6. In the Manage Connections–Add TCP/IP Port dialog box, enter the required information:

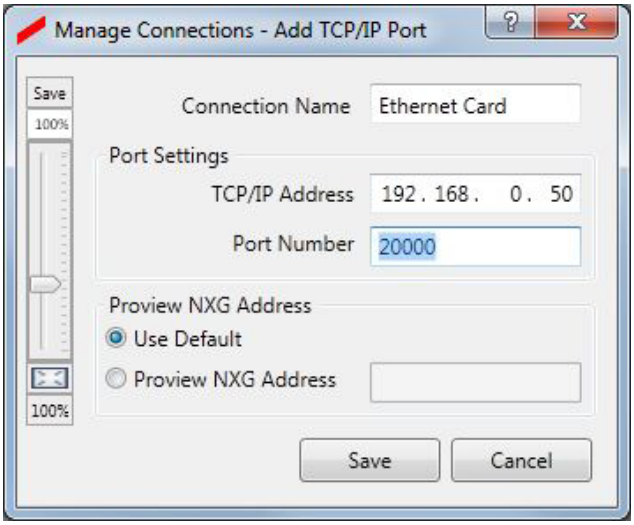
A. Connection Name–Basic description of the port being configured. As a default, the IP address and Port number will be included in the name and does not need to be added to the name created.

B. TCP/IP Address–The address of the communications module being used. The default address for a new card is 192.168.0.50.

C. Port Number–The port number of the port being used on the communications module. The default port number is 20000.

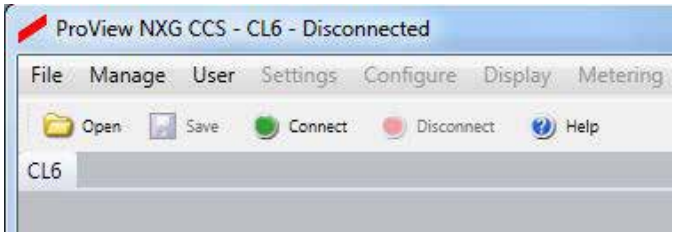
D. **ProView** *NXG* Address–Selecting Use Default will use the default Master address of the CL-6 control. If another address is to be used, select and enter a **ProView** *NXG* Address. Click Save once the settings have been entered.

Note: See Cooper Power Systems *Service Information S225-11-1 CL-6 Series Control Installation, Operation, and Maintenance Instructions* for more information on Master Address Settings.

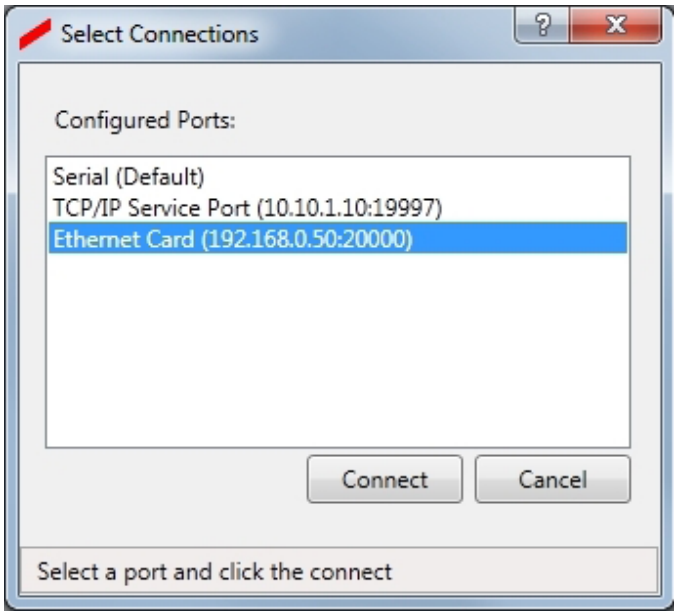


Note: The communication port on the CL-6 series control must also be set for DNP. The function code (FC) on the control for the settings is FC 60 for Com 1/Com 3 and FC 160 for Com 2.

7. To start communications click on the Connect button.



8. Select the port that has just been created and select Connect to start communications.



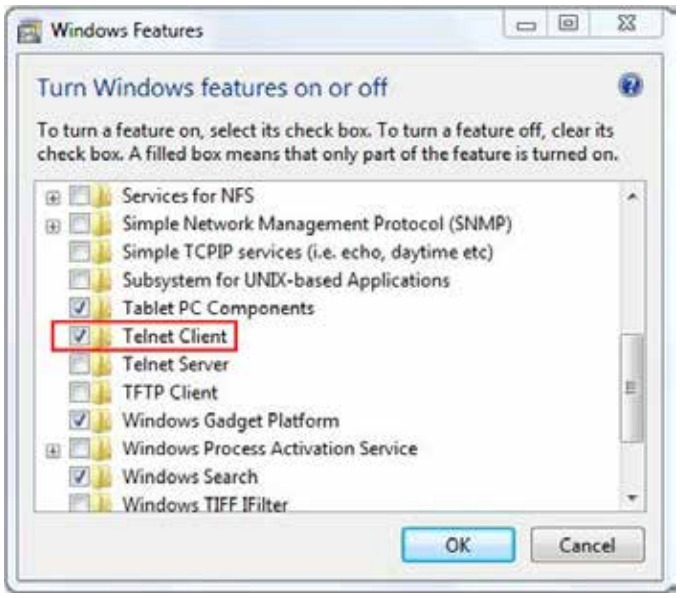
9. A successful connection will bring up a Connect dialog box.

APPENDIX A

Setting the IP Address of an Ethernet Card When it is Unknown

This procedure can be used to reset the IP address of an Ethernet communications card that has already been configured, but the IP address is unknown.

Note: This procedure will use the **ARP** command in the Microsoft® Windows® command prompt. If you are using a Windows 7® operating system, the Telnet Client feature must be enabled for the procedure to work. On Windows XP® and Vista® operating systems, the feature should be enabled as a default. To enable the Telnet Client feature, go to the Control Panel and click on Programs and Features. On the top left of the Programs and Features dialog box, click on Turn Windows Features On or Off. In the Windows® Features dialog box, check Telnet Client and then click OK.

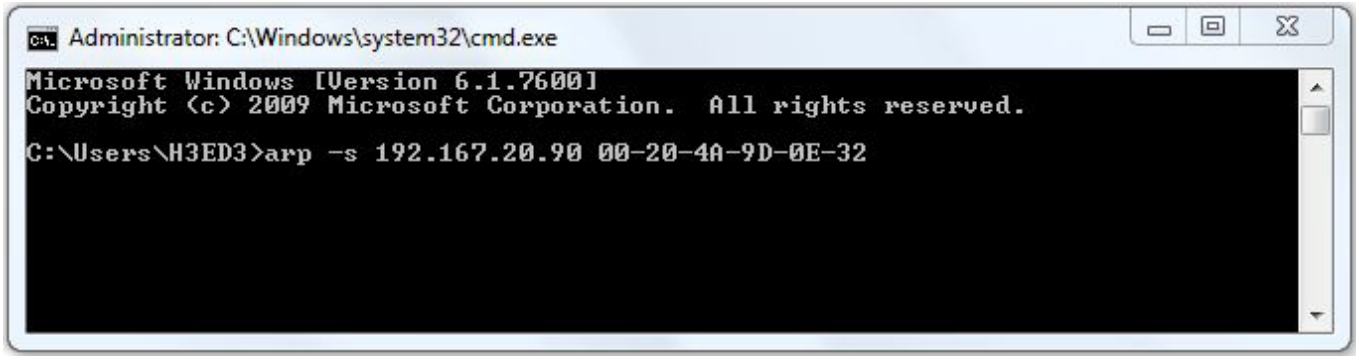

Windows Features
Turn Windows features on or off
To turn a feature on, select its check box. To turn a feature off, clear its check box. A filled box means that only part of the feature is turned on.
Services for NFS
Simple Network Management Protocol (SNMP)
Simple TCPIP services (i.e. echo, daytime etc)
Subsystem for UNIX-based Applications
Tablet PC Components
Telnet Client
Telnet Server
TFTP Client
Windows Gadget Platform
Windows Process Activation Service
Windows Search
Windows TIFF IFilter
OK
Cancel

To reset the IP address, use the following steps:

1. Turn power off to CL-6 control's Ethernet card. Set the dip switch to copper. Install the RJ45 Cat5 or Cat6 cable into the connector on the card.

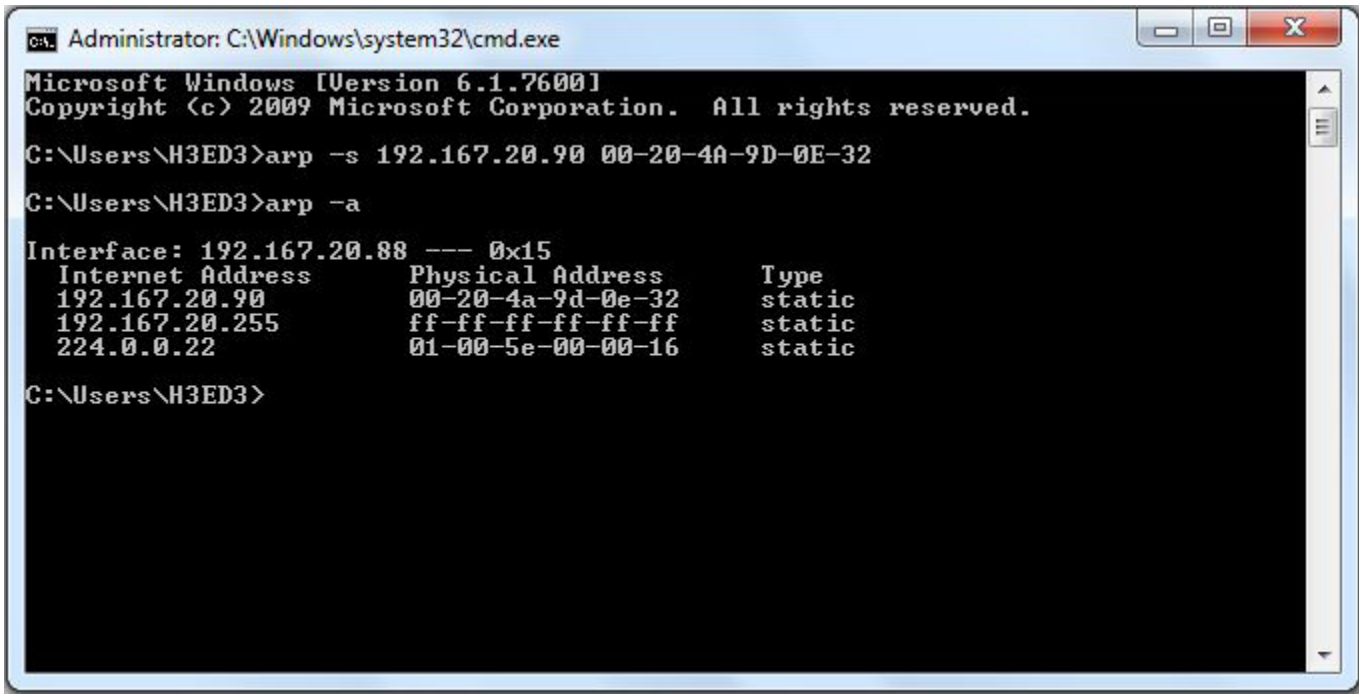
   Note: For computers manufactured over the last several years, a standard straight through cable will work; older computers may require the use of a crossover cable.

2. Install the other end of the cable into your computer. Disable any other active network connections, including wireless connections.
3. Turn power on to CL-6 control's Ethernet card.
4. Start a command prompt by clicking Start -> Run, typing cmd in the window and clicking OK.
5. Assign a temporary address to the communications card by typing at the command prompt the command **Arp -s xxx.xxx.xxx.xxx 00-20-4a-yy-yy-yy** and then press enter. The xxx is the IP address that you want to assign to the card and yy is the remaining Media Access Control (MAC) address digits found on the label on the communications card.

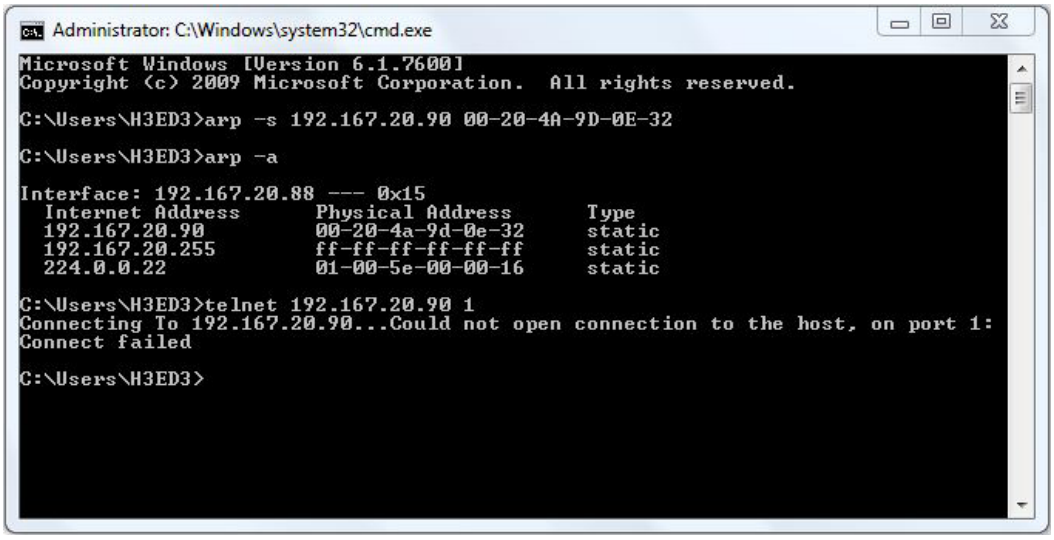

Administrator: C:\Windows\system32\cmd.exe
Microsoft Windows [Version 6.1.7600]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.
C:\Users\H3ED3>arp -s 192.167.20.90 00-20-4A-9D-0E-32

6. You can confirm that the temporary IP assignment occurred by typing the command **Arp –a** at the command prompt. If the assignment occurred, you will see the newly assigned IP address being associated with the MAC address in the list that appears.

Note: Typing the command **Arp –d** and hitting enter will remove all temporarily assigned IP addresses created with the **Arp –s** command. This can be done when the process is complete in preparation for setting the IP address on other communications cards.

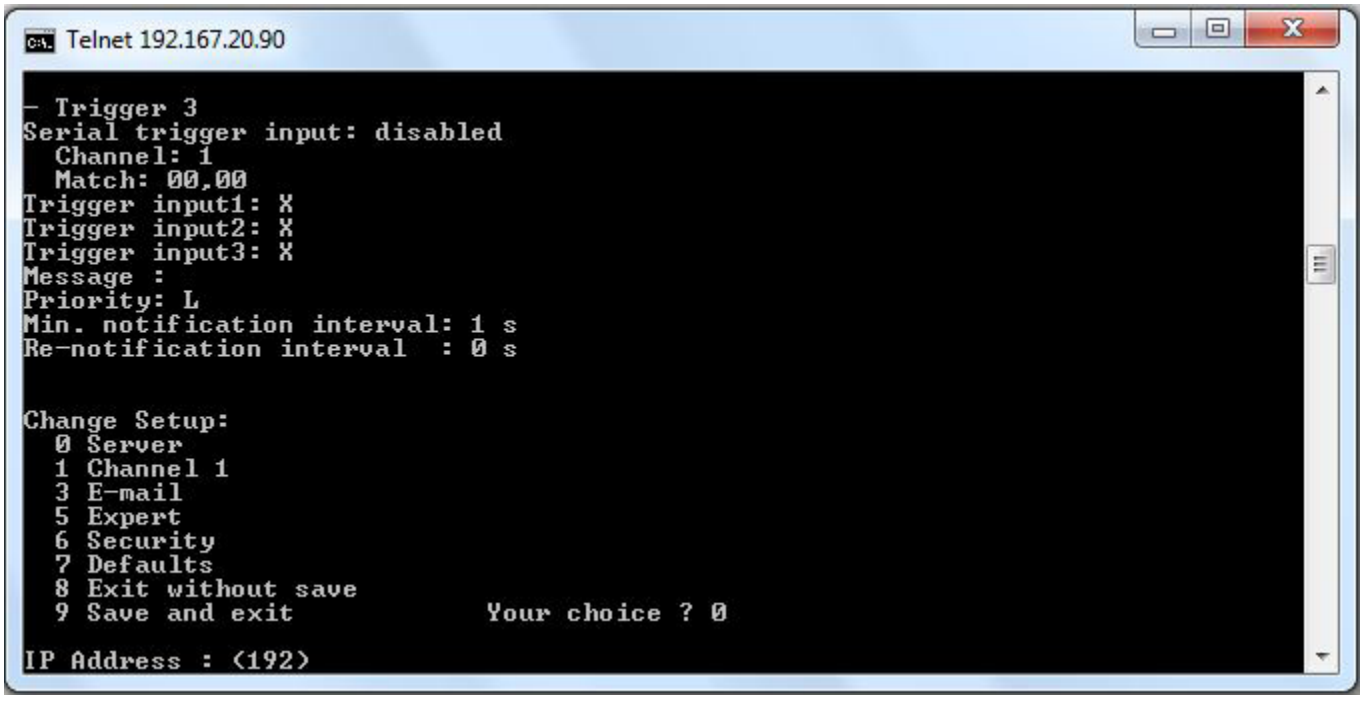


7. At the command prompt type **Telnet xxx.xxx.xxx.xxx 1** where xxx is the IP address temporarily assigned in Step 5. This command should time out almost immediately and it will indicate that the connection failed.


Administrator: C:\Windows\system32\cmd.exe
Microsoft Windows [Version 6.1.7600]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.
C:\Users\H3ED3>arp -s 192.167.20.90 00-20-4A-9D-0E-32
C:\Users\H3ED3>arp -a
Interface: 192.167.20.88 --- 0x15
Internet Address Physical Address Type
192.167.20.90 00-20-4a-9d-0e-32 static
192.167.20.255 ff-ff-ff-ff-ff-ff static
224.0.0.22 01-00-5e-00-00-16 static
C:\Users\H3ED3>telnet 192.167.20.90 1
Connecting To 192.167.20.90...Could not open connection to the host, on port 1:
Connect failed
C:\Users\H3ED3>

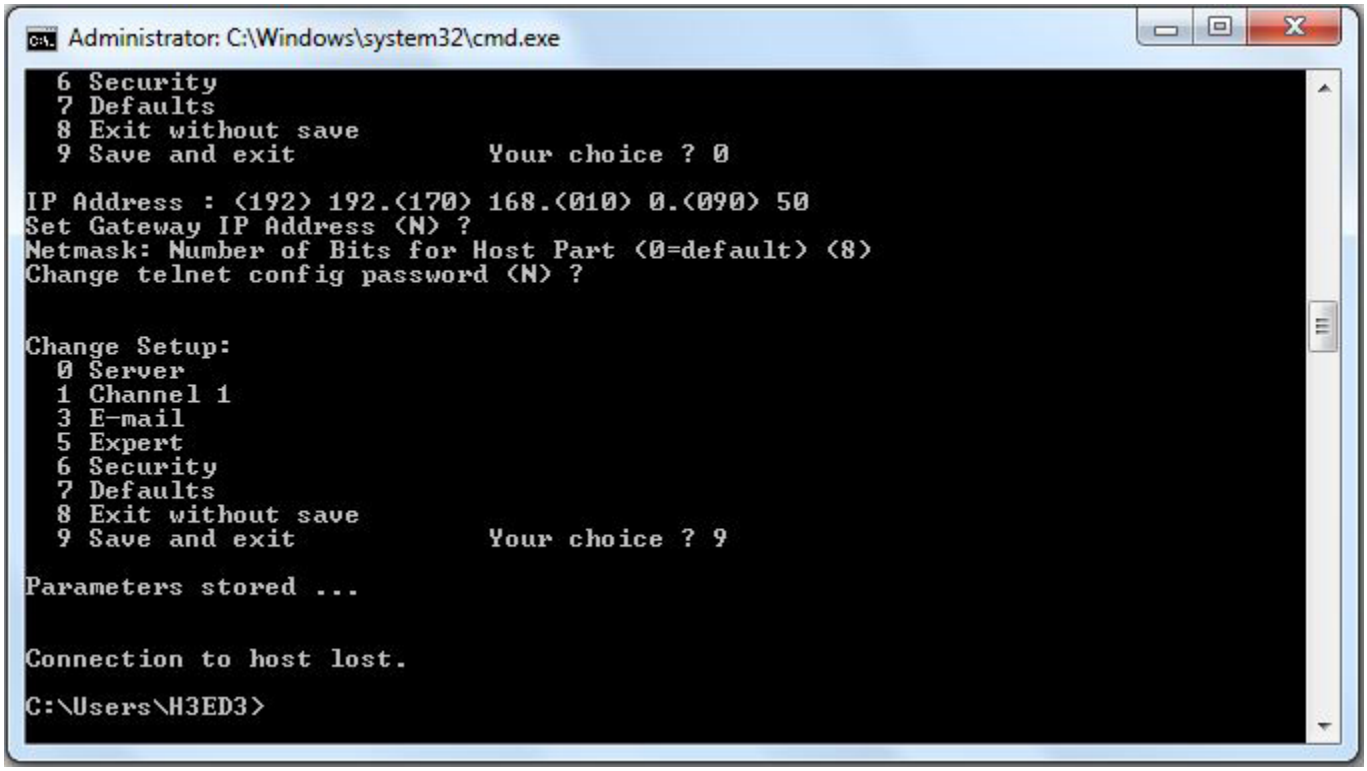
8. At the command prompt type **Telnet xxx.xxx.xxx.xxx 9999** where xxx is the IP address temporarily assigned in Step 5. This command will run through a number of lines and end up with the prompt to Press Enter for the Setup Mode. Within 3 seconds of the command being executed, press enter to go into the Setup Mode.

9. Type in **0** to select Server and hit enter.



10. Type in the four parts of the new IP address at the prompt and hit enter after each. In this case the default IP address (192.168.0.50) was entered, but any address could be used. After the IP address is entered, hit enter three (3) more times to select the default inputs for each of the remaining settings.

11. Type in **9** and hit enter to Save and Exit.



12. The entry of the new IP address is now complete.

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